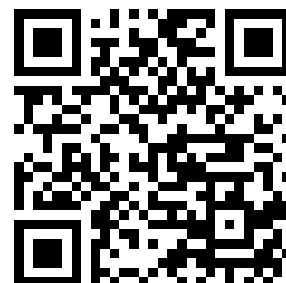


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FORCES

JAPANESE ELECTRONICS

15 MARCH, 1945

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# JAPANESE ELECTRONICS

"Japanese Electronics" is the first of several replacement supplements to Section 8, Technical Studies, PHOTOGRAPHIC INTERPRETATION HANDBOOK-UNITED STATES FORCES, dated April 1944. Other studies of Section 8 are under revision and will be issued to complete and replace entire section.

Four distinct types of electronics installations are represented in this supplement: Radar, Communications, Direction Finding, and Navigational Aids. Only major characteristics, usages and graphic appearances of these are included. For further and detailed information refer to (1) "JAPANESE ELECTRONICS," Photographic Intelligence Center - Report 1, OPNAV 16 VP101, January 1945; and (2) "TECHNICAL DATA ON JAPANESE RADIO AND RADAR EQUIPMENT," Naval Research Laboratory Report #RA3A215B.

Certain examples of German Electronics are included because of probable availability of German equipment and methods for Japanese use.

## GLOSSARY

**DIPOLE** Center fed rod or wire antenna, usually elevated.

**UNIPOLE** End fed pole, rod or wire antenna, usually vertical and grounded. (Also called MONOPOLE)

**KILOCYCLE** 1000 cycles. (In electronics, used to indicate frequency in kilocycles per second)

**MEGACYCLE** 1,000,000 cycles. (In electronics, used to indicate frequency in megacycles per second).

**FREQUENCY (KCS)**=300,000 (Velocity of light in Kilometers per Wave length (meters) second)

## STANDARD FREQUENCY TABLE

SHF -- Super High Frequency	. . . . .	3000-30000 Mcs. ("microwave")
UHF -- Ultra High Frequency	. . . . .	300-3000 Mcs.
VHF -- Very High Frequency	. . . . .	30-300 Mcs.
HF -- High Frequency	. . . . .	3-30 Mcs.
MF -- Medium Frequency	. . . . .	300-3000 Kcs. (0.3-3 Mcs.)
LF -- Low Frequency	. . . . .	30-300 Kcs. (0.03-0.3 Mcs.)
VLF -- Very Low Frequency	. . . . .	10-30 Kcs. (0.01-0.03 Mcs.)

## RADAR SUMMARY

## DEFINITION

Radar is an electronic device which emits a continuous stream of pulses of radio waves at extremely high frequencies (70 to 30,000 mcs) which are reflected back from a dense obstruction and presented on a cathode ray tube to record position and range of that obstruction in a visual manner.

## USES

Present known uses of Japanese Radar include air search, surface search, fire control and searchlight control.

## INTERPRETATION FEATURES

## Land Based Search Radar:

Location: High points in mountainous areas.

Sites often near seacoasts.

Characteristics:

- Isolated ground scar and connecting road.
- Antenna (size, shape, shadow).

- Generator building usually associated.

- May be found as multiple installations.

## Land Based AA Fire Control:

Location: Associated with Heavy Batteries.

Characteristics: (Information incomplete but following may be expected):

- Installation usually found within 600' from fire control center of battery.

- May be in revetment or in circular cleared area.

- Complete Radar may consist of one unit, or transmitter and receiver may be separated.

## USE OF FREQUENCY DATA

Frequency bands listed in table below may be utilized for positive identification of radar types through collaboration with the local Electronics officer.

## TABLE OF IMPORTANT JAPANESE RADAR TYPES

	POPULAR NAME	JAPANESE DESIGNATION	ANTENNA	FREQUENCY IN MCS.	USE	REMARKS
LAND BASED SEARCH	GUADALCANAL TYPE	MARK I, MODEL 1	26'x18'	97-103	A.W.	FIRST FOUND ON GUADALCANAL
	"ATTU TYPE"	MARK I, MODEL 1 MODIFICATION 1	28'x14'x2 1/3'	97-103	A.W.	'BOX' TYPE ANTENNA
	"MOBILE MATTRESS"	MARK I, MODEL 2	14'x7'x1 2/3'	187-205	A.W.	OFTEN FOUND EMPLACED IN A REVETMENT
	"MARK VI PORTABLE"	AIR MARK VI "SPECIAL"	7' YAGI DIPOLES MOUNTED ON COLLAPSIBLE TRIPOD	140-160	A.W.	PORTABLE ADAPTATION OF AIR-BORNE SET
	"LADDER TYPE"	MARK I, MODEL 3	STACK OF 3 1/2 FT. OR 7 FT. DIPOLES	140-160	A.W.	SET MAY BE LAND-BASED OR SHIP-BORNE
	"WEWAK YAGI"	"YA" OR MARK B	2 HORIZONTAL ROWS OF YAGI DIPOLES ON A MAST	60-80	A.W.	TRANSPORTABLE PHOTOGRAPHED AT WEWAK 1943. INCREASING USE.
	"CHI"	"CHI" OR MARK 229	SIMILAR TO WEWAK YAGI	60-80	A.W.	FIXED TRANSMITTER T. AND R. ARE AT SEPARATE LOCATIONS. INCREASING USE.
SHIP-BORNE	"SHIP MATTRESS"	MARK 2, MODEL 1	14'x7'x1 2/3' (SIMILAR TO MOBILE MATTRESS)	187-205	A.W. S.W.	SAME AS MOBILE MATTRESS WITH A DIFFERENT ANTENNA MOUNT.
	"2-HORN TYPE"	MARK 2, MODEL 2	2 ELECTRO-MAGNETIC HORNS APPROX. 3' LONG	3000	S.W.	HORNS MAY BE IN TURNABLE. RECEIVER IS HIGHER THAN TRANSMITTER.
	"3-HORN TYPE"	MARK 2, MODEL 2 MODIFICATION 2	3 ELECTRO-MAGNETIC HORNS APPROX. 3' LONG	3000	S.F.C. S.W.	RECEIVER HORN IS REPLACED BY DOUBLE HORN ATTACHMENT
	"PARABALOID"	MARK 2, MODEL 3	PROBABLY PARABALOID	520	S.W. A.W. A.A.F.C.	(CAPTURED DOCUMENTS ONLY)
AIR BORNE		AIR MARK VI MODEL 4	VARIOUS: YAGI, DIPOLES, ARRAYS	140-160	A.S.V. A.I.	FIRST USED IN BETTY. NOW IN ALL TYPES OF PLANES WITH VARIOUS ANTENNA DESIGNS
FIRE AND SEARCHLIGHT CONTROL		MARK IV, MODEL 1 (S-3)	MATTRESS 25 3/4'x6'x4'	200	A.A.F.C. A.W.	ADAPTATION OF OUR SCR 250
		MARK IV, MODEL 2 (ALSO MODIF. 2)	PROBABLY MATTRESS	200	A.A.F.C. A.W.	SMALLER AND IMPROVED MK IV, MODEL 1 (CAPTURED DOCUMENTS ONLY)
		MARK IV, MODEL 3	4 YAGIS ON S/L YAGI ON S/L CONTROLLER	200	A.A.F.C. S.L.C.	SIMILAR TO BRITISH "SLC" BUT TRANSMITTING ANTENNA SEPARATED
		MARK "TA", MODEL 1	4 YAGIS WITH TRANS. ANTENNA ATTACHED ABOVE	200	A.A.F.C.	(CAPTURED DOCUMENTS ONLY)
		MARK "TA", MODEL 2	5 YAGIS - EACH WITH REFLECTOR	200	A.A.F.C. A.W.	(CAPTURED DOCUMENTS ONLY)
		MARK "TA", MODEL 3	ELABORATE ANTENNAE SYSTEM T/R SEPARATED	75	A.A.F.C.	ADAPTATION OF BRITISH "ML" MARK 2 (CAPTURED DOCUMENTS ONLY)

## LEGEND

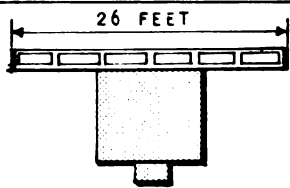
A.W. --- AIR WARNING  
S.W. --- SURFACE WARNING  
S.F.C. - SURFACE FIRE CONTROL  
A.A.F.C. - A/A FIRE CONTROL  
S.L.C. - SEARCHLIGHT CONTROL  
A.S.V. - AIRPLANE SEARCH FOR SURFACE CRAFT  
A.I. --- AIRBORNE INTERCEPT

NOTE: IN ADDITION TO THE ABOVE, GERMAN RADAR TYPES MAY BE FOUND IN USE IN JAPANESE CONTROLLED AREAS.



15 MARCH 1945

**LAND BASED - FIXED**



**VERTICAL VIEW**

**ANTENNA** 26' x 18'

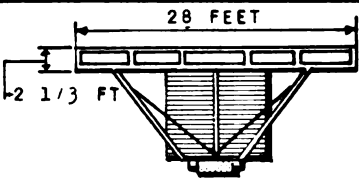
**LOCATION** High points and near sea-coast.

**USE** Early warning.

**COMMENTS** Oldest type. Still in use. Usually flat roof. Antenna and shack rotate on turntable. 100 MCS. (MK1, MODEL 1).

**GUADALCANAL TYPE**

**LAND BASED - FIXED**



**VERTICAL VIEW**

**ANTENNA** 28' x 14' x 2 1/3'

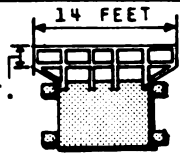
**LOCATION** High points and near sea-coast.

**USE** Early warning

**COMMENTS** Improved Guadalcanal Type. Box screen. Usually pitched roof. Antenna and shack rotate on turntable. 100 MCS. (MK1, MODEL 1, Modification 1).

**A T T U T Y P E**

**LAND BASED - MOBILE**



**VERTICAL VIEW**

**ANTENNA** 14' x 7' x 1 2/3'

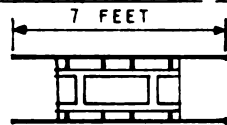
**LOCATION** Often on high points and near seacoast.

**USE** Early warning.

**COMMENTS** Although mobile, this is often set in fixed emplacements sometimes in addition to other fixed types. 200 MCS. (MK1, MODEL 2).

**MOBILE MATTRESS**

**LAND BASED - PORTABLE**



**VERTICAL VIEW**

**ANTENNA** 7' x 7'

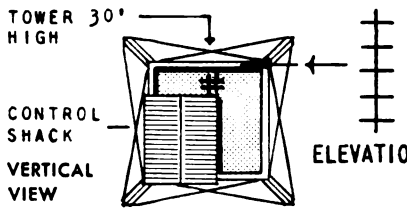
**LOCATION** Near airfields, etc.

**USE** Short range early warning.

**COMMENTS** Portable adaptation of airborne set (MK 6, MODEL 4). Difficult to interpret. 150 MCS.

**MARK 6 PORTABLE**

**LAND BASED AND SHIP BORNE**



**VERTICAL VIEW**

**ANTENNA** Stack of 7' or 3 1/2' dipoles on mast.

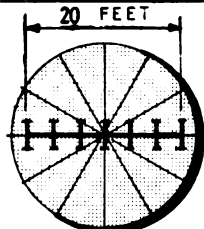
**LOCATION** Land - Various; ships.

**USE** Early warning.

**COMMENTS** Stack of dipoles main identifying characteristic (resembles a ladder). On land, - sometimes on observation tower. On SHIP, - adapted to fit any existing masts. 150 MCS. (MK1, MODEL 3).

**L A D D E R T Y P E**

**LAND BASED - PORTABLE OR FIXED**



**VERTICAL VIEW**

**ANTENNA** Array of horizontal dipoles on mast.

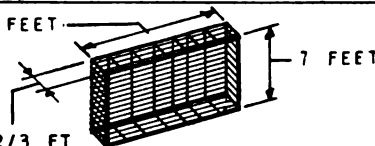
**LOCATION** Land - Various.

**USE** Early warning

**COMMENTS** Same types have separated transmitting antenna. Mast supporting. Tent often used to cover ladder equipment and operations. 70 MCS. (MK 229 etc.)

**WEWAK TYPE OR "CHI"**

**SHIP BORNE SEARCH**



**VERTICAL VIEW**

**ANTENNA** 14' x 7' x 1 2/3'

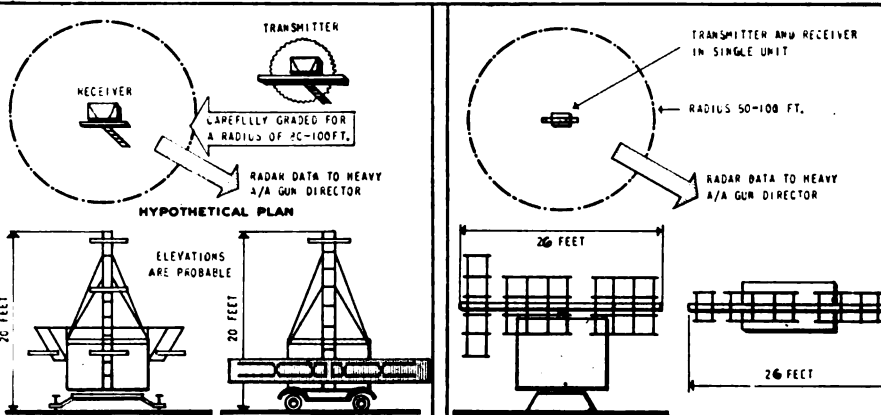
**LOCATION** SHIPS, - on mast or superstructure.

**USE** Early warning.

**COMMENTS** Essentially the same Radar as the land-based Mobile Mattress but has different designation. 200 MCS. (MK2, MODEL 1).

**SHIP MATTRESS**

**FIRE CONTROL PATTERNS - LAND BASED**



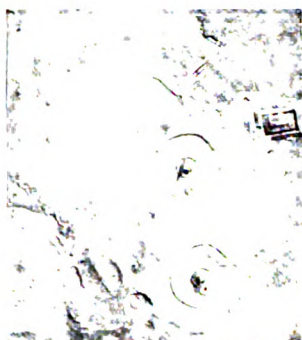
**MARK TA MODEL 3**

**MARK 4 MODEL 1**

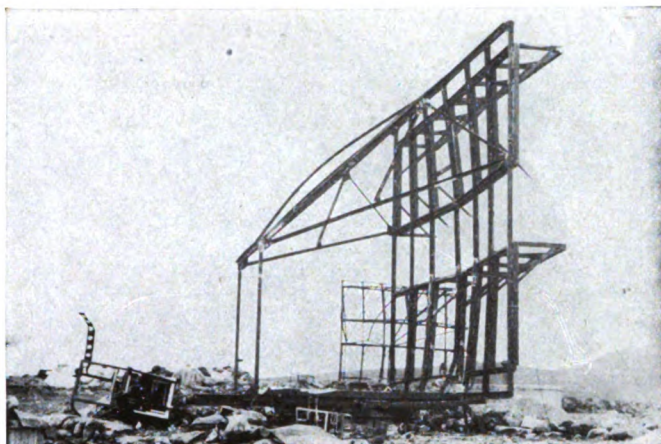
15 MARCH 1945



**GUADALCANAL TYPE**



R. F. - 1/3000



**GUADALCANAL TYPE**



**ATTU TYPE**

R. F. - 1/2600



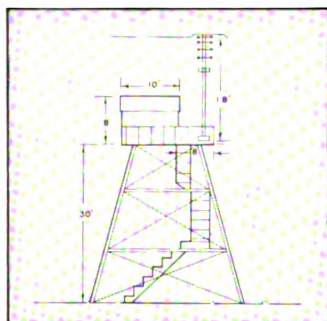
**ATTU TYPE**



**MOBILE MATTRESS**



**MARK 6 PORTABLE**



**LADDER TYPE**



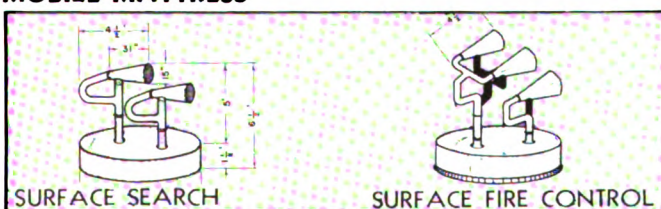
**MOBILE MATTRESS**



**WEWAK TYPE**



**SHIP MATTRESS**



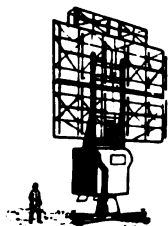
**HORN TYPES**



# TECHNICAL STUDIES GERMAN RADAR

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**ANTENNA** 20' x 16' (IFF 16 1/2 x 3 1/2')

**USE** Air Search.

**COMMENTS** Early type.

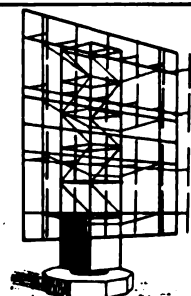
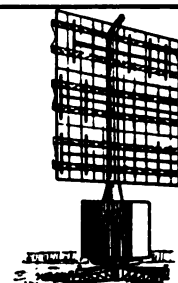
**LIMBER FREYA**

**ANTENNA** 20' x 16' (IFF 20' 8')

**USE** Air Search.

**COMMENTS** Most used search Radar.

**POLE FREYA**



**ANTENNA** 35' x 34'

**USE** Coast Watching

**COMMENTS** New Type, 1944.

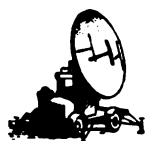
**LARGE COASTWATCHER**

**ANTENNA** 20' x 8'.

**USE** Coast Watching  
Surface Fire Control

**COMMENTS** Range varies with elevation of site above sea level.

**GEMA COASTWATCHER**



**ANTENNA** Paraboloid, Diameter 10'.

**USE** AA Fire Control.

**COMMENTS** Several types, usually mobile. Very efficient and widely used.

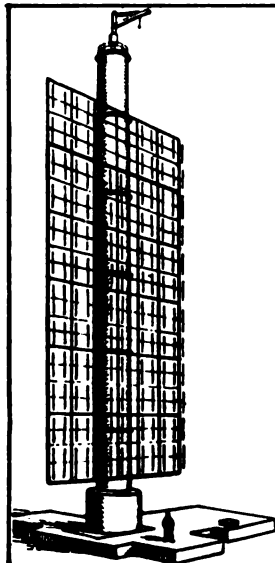
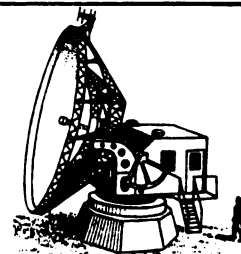
**SMALL WURZBURG**

**ANTENNA** Paraboloid, Diameter 24'.

**USE** Ground Control Intercept, Air Search, and Coast Watching.

**COMMENTS** Non-mobile, much used multi-purpose Radar.

**GIANT WURZBURG**



**ANTENNA** 60' x 97 1/2' (IFF - 22')

**USE** Air Search.

**COMMENTS** Long Range Early Warning.

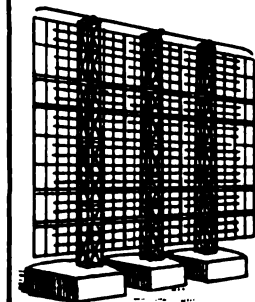
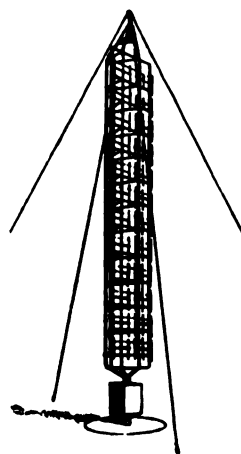
**CYLINDRICAL CHIMNEY**

**ANTENNA** 19 1/2' x 97 1/2'

**USE** Air Search.

**COMMENTS** Long Range Early Warning.

**GIRDER CHIMNEY**



**ANTENNA** 63 1/2' x 44 1/2'

**USE** Coast Watching.

**COMMENTS** Recent type. Long Range Early Warning.

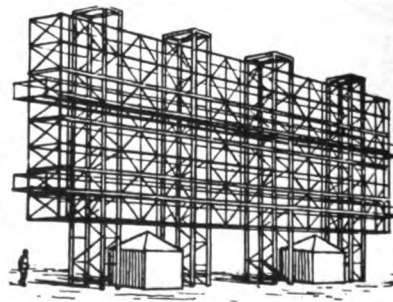
**SMALL HOARDING**

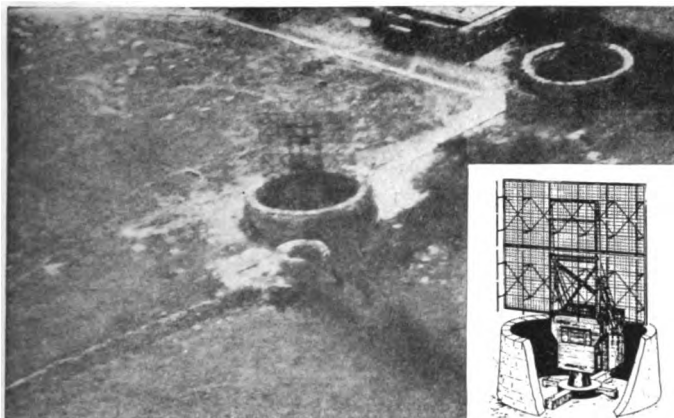
**ANTENNA** 98' x 36 1/2'.

**USE** Coast Watching

**COMMENTS** Long Range Early Warning.

**LARGE HOARDING**

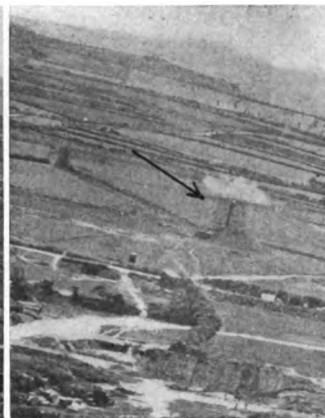




**LIMBER FREYA**



**POLE FREYA**



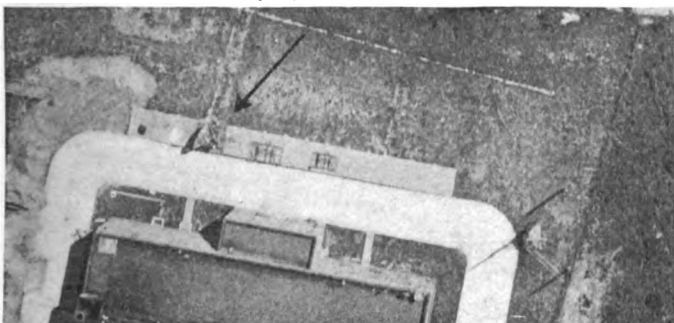
**GEMA COASTWATCHER**



R. F. - 1/11000

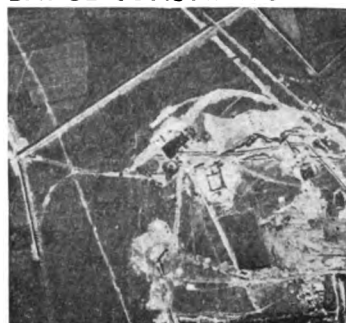


**LARGE COASTWATCHER**

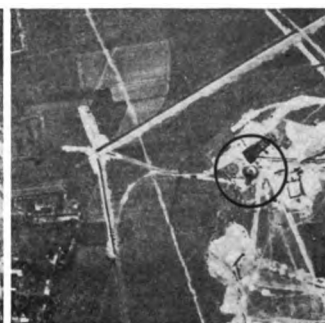


**SMALL WURZBURG**

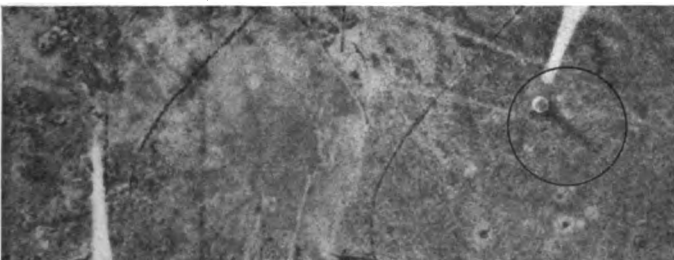
R. F. - 1/ 1000



**GIANT WURZBURG**

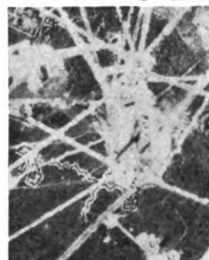


R. F. - 1/ 8500

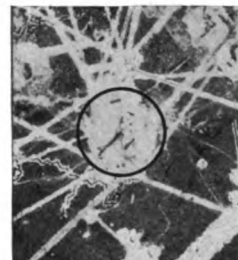


**GIRDER CHIMNEY**

R. F. - 1/ 5000



**CYLINDRICAL CHIMNEY**

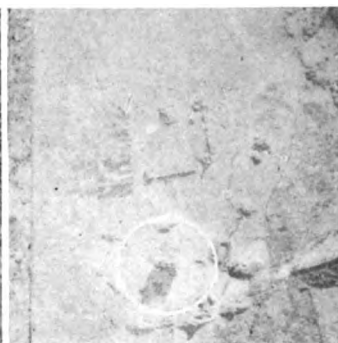


R. F. - 1/ 10000

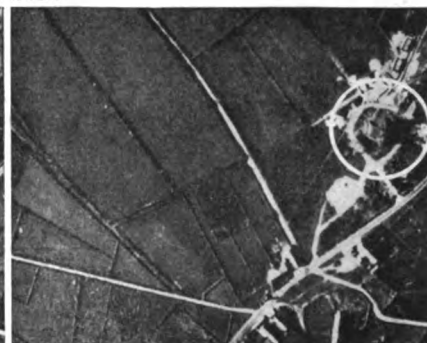


**SMALL HOARDING**

R. F. - 1/ 9000



**LARGE HOARDING**



R. F. - 1/ 11000

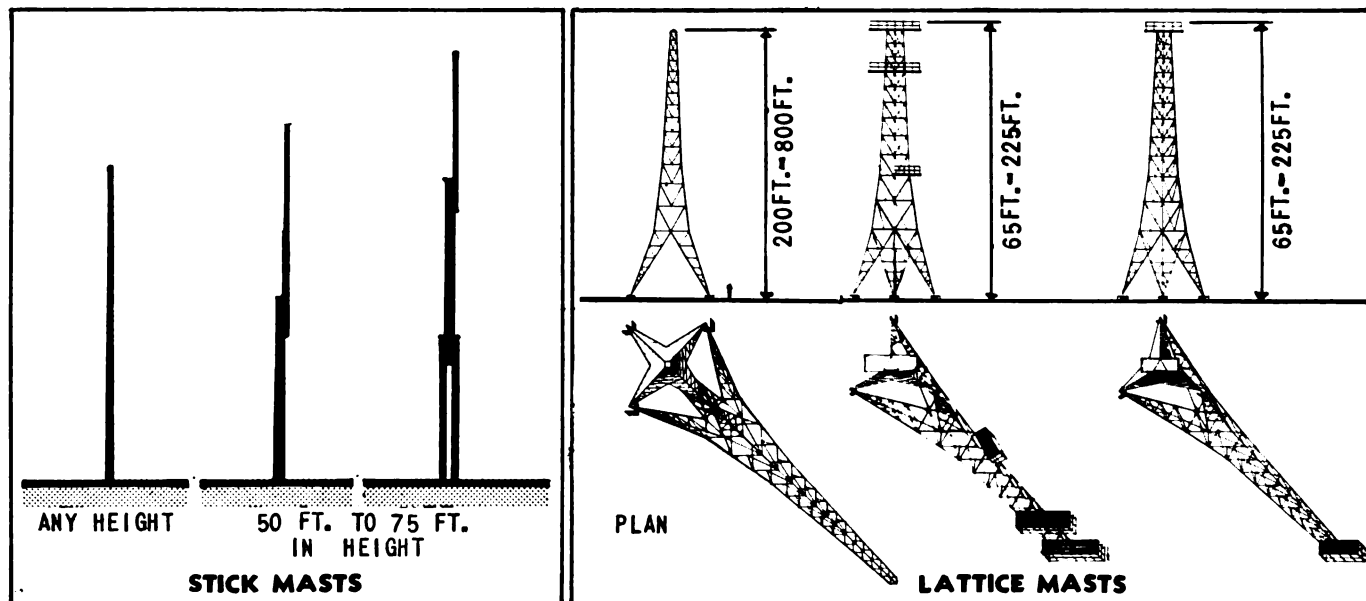


## COMMUNICATIONS SUMMARY

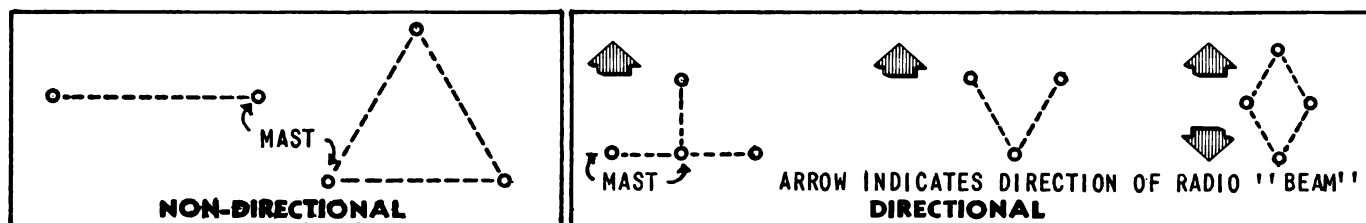
The field or Radio Communications involves transfer of intelligence from one point to another and includes all installations from the portable high frequency station to the large multi-frequency military and pre-war station.

The interpreter is concerned primarily with fixed land based stations. Determination of the capacities and ranges of these stations involves analysis of mast types, mast heights and mast patterns.

### MAST TYPES



### MAST PATTERNS



### MAST-FREQUENCY RELATIONSHIP (FIXED INSTALLATIONS)

	FREQUENCY	NO. MASTS	MAST HEIGHT	FREQUENCY IN MEGACYCLES PER SEC.	WAVE LENGTH	USUAL OPERATING RANGE
STICK MASTS	"VERY HIGH (LINE OF SIGHT)	1	GERMAN DECIMETRE STATIONS HAVE 160' MASTS	30 TO 300 MCS (50 TO 100 LIKELY)	10 TO 1 METER	75 MILES
	HIGH	1 TO 3	WHIP ANTENNAE OR VERY SMALL STICK MASTS	3 TO 30 MCS	100 TO 10 METERS	200 OR 8000 MILES
	MEDIUM**	2 OR MORE	50' TO 75'	0.3 TO 3 MCS	1000 TO 100 METERS	500 MILES
LATTICE MASTS	MEDIUM**	2 OR MORE	60' TO 100'	0.3 TO 3 MCS (300 TO 3000 KCS.)	1000 TO 100 METERS	500 MILES
	LOW	2 OR MORE	100' TO 500' (125' TO 300' MOST LIKELY)	0.03 TO 0.3 MCS (30 TO 300 KCS)	10,000 TO 1000 METERS	1000 MILES
	VERY LOW	3 OR MORE	400' TO 800' STICK OR LATTICE	10 TO 30 KCS	30,000 TO 10,000 METERS	5000 MILES

\* Although there are many types of V.H.F. antennae in connection with portable, mobile, and airborne equipment, no fixed Japanese installations have been seen as

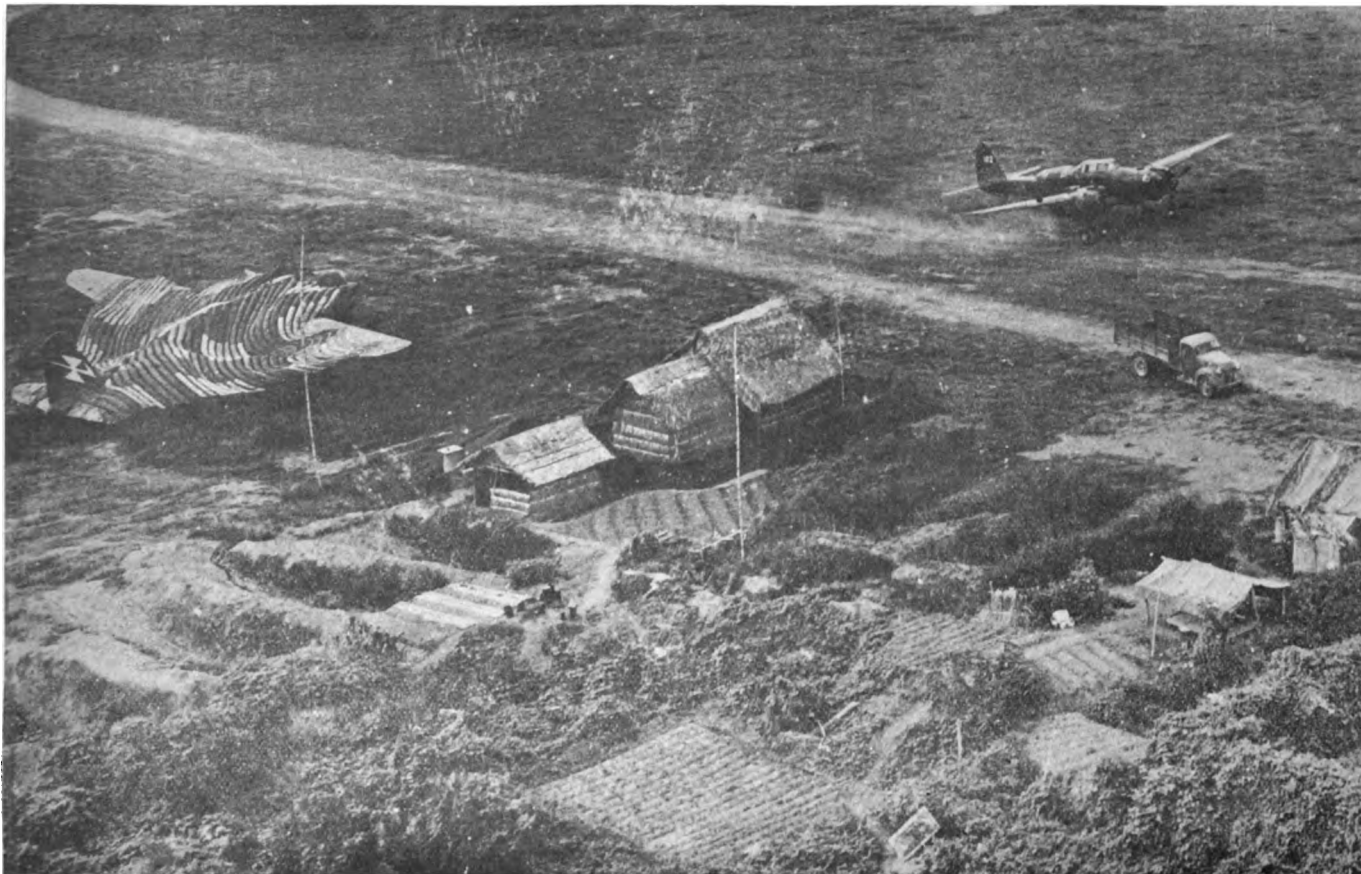
yet which operate at such high frequency.

\*\* Most used for land based communication stations.

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# TECHNICAL STUDIES JAPANESE COMMUNICATIONS



**HIGH FREQUENCY**

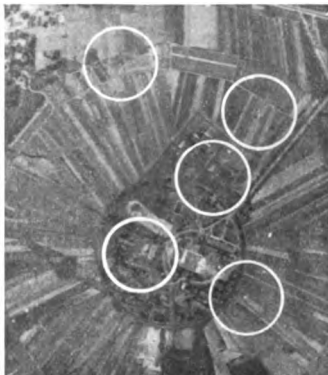


R. F. - 1/4500



**MEDIUM FREQUENCY**

**MEDIUM FREQUENCY**



R. F. - 1/16400



R. F. - 1/17700

**LOW FREQUENCY**

**LOW FREQUENCY**

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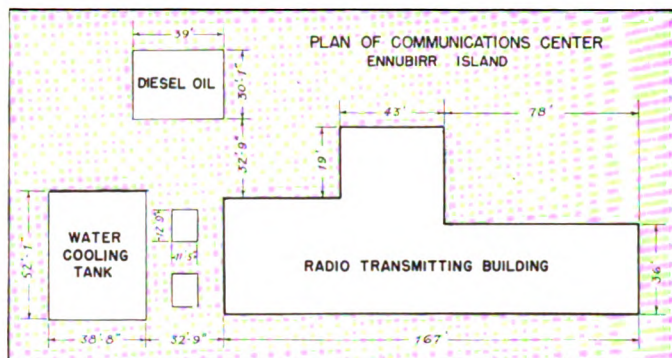


# TECHNICAL STUDIES JAPANESE COMMUNICATION CENTERS

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**MEDIUM FREQUENCY**



**MEDIUM FREQUENCY**



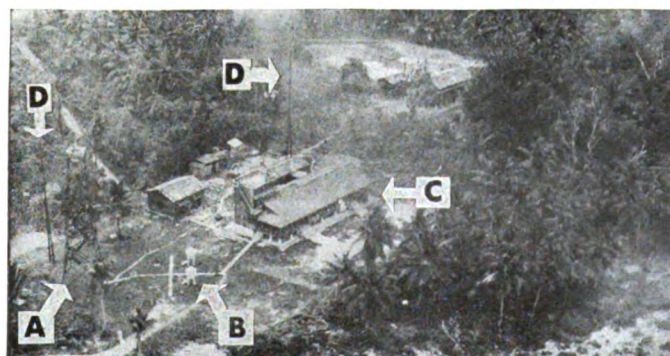
**MEDIUM FREQUENCY**



**MEDIUM FREQUENCY**



## WEATHER STATIONS



R.F.-1/2000

**MEDIUM FREQUENCY**

- A** Tower for wind instruments.
- B** Weather instrument houses.
- C** Headquarters building containing transmitter. Note platform atop building.
- D** Med. freq. stick masts for radio reporting station.



R.F.-1/7500

**LOW FREQUENCY**

- A** Weather instrument houses.
- B** Headquarters building with platform on roof.
- C** Low frequency lattice masts for radio reporting station.

**DIRECTION FINDING SUMMARY**

**DIRECTION FINDERS:** Operate on received radio signals and indicate their direction of arrival. Direction Finding is utilized primarily as a navigational aid by the Japanese but is also used for intelligence purposes.

**CHARACTERISTICS OF D. F. TYPES MOST USED BY JAPANESE**

**1 ADCOCK:** Four vertical antennae arranged in square pattern, diagonals oriented N-S, E-W.

- (a) Housed:
- High Frequency
  - Antennae (dipoles) enclosed in square building, (23' x 23' roof plan).
  - Antennae located in corners of building.
  - Station may consist of one or more housed Adcocks.
  - Most D. F. centers have 3 housed Adcocks arranged in a triangle or on a straight line.

- (b) Open:
- Medium Frequency
  - Four stick masts (unipoles) arranged in square pattern.
  - Small hut in center, approx. 20' square.
  - Strongly visible diagonal lines connecting antennae.
  - Diagonal distance between unipoles approx. 100'.

- (c) Semi Portable:
- High Frequency
  - Four small stick masts (poles) arranged in square.
  - Diagonal distance between poles approx. 18'.
  - Small operator's tower (7' x 7' approx.) in center of square.
  - Difficult to interpret from aerial photos

**2 LOOP:** Medium Frequency rotating loop, (3' in diam.) housed in 11' - 12' square building. Similar to shipborne units.

**GENERAL NOTES ON JAPANESE D. F.**

1. Located near airfields (and other locations).
2. Site is well cleared, fairly level and high.
3. Pattern of roads and paths connecting installations usually visible.
4. Radio communications station (reporting station) is always associated.
5. High and medium frequency set-ups are usually present in combination at important D. F. centers.
6. A Japanese D. F. center usually consists of:
  - (a) 1, 2, or 3 HF installations or
  - (b) 1 or 2 MF installations or
  - (c) Combinations of high and medium frequency up to a usual maximum of three high and two medium.

**TABLE OF FREQUENCIES**

FREQUENCY	UNIPOLE OR (DIPOLE) DIAGONAL SPACING	UNIPOLE (OR DIPOLE) HEIGHT	WAVE LENGTH IN METERS	FREQUENCY IN MEGACYCLES PER SEC.
HIGH ("HOUSED ADCOCK")	20' TO 30' (MOST ARE 25')	15' TO 25'	100 TO 10 M	3 TO 30 MCS.
MEDIUM ("OPEN ADCOCK")	90' TO 150' (MOST ARE 100')	50' TO 75'	1000 TO 100 M	0.1 TO 3 MCS.



# TECHNICAL STUDIES

## HIGH FREQUENCY ADCOCK D.F.

CONFIDENTIAL

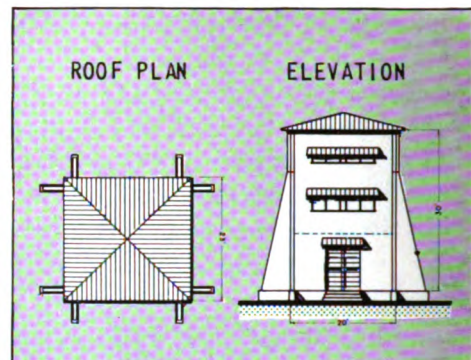
15 MARCH 1945



HIGH FREQUENCY TOWER



R.F.-1/2200

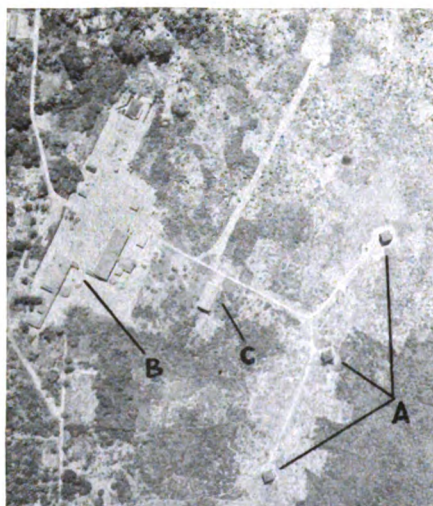


HIGH FREQUENCY TOWER



"A"—HIGH FREQUENCY TOWERS

"B"—D. F. CENTER (HEADQUARTERS BLDG.)

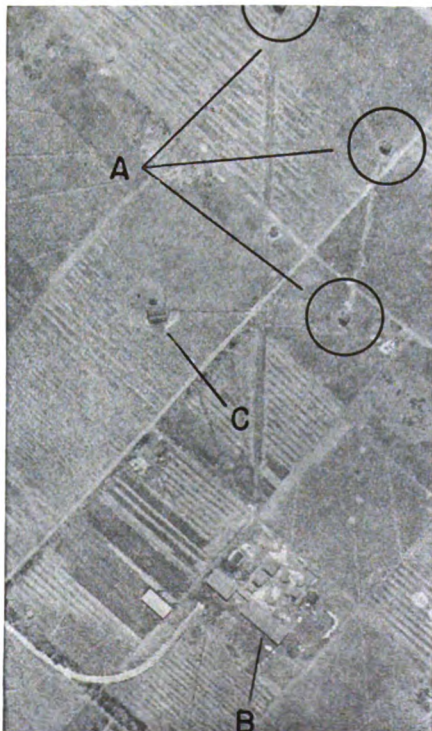


R.F.-1/5000

"C"—PROB GENERATOR BUILDING



HIGH FREQUENCY TOWER  
(OPERATOR AND RECEIVER ARE ON SECOND FLOOR)



"A"—HIGH FREQUENCY TOWERS

"B"—D. F. CENTER (HEADQUARTERS BLDG.)

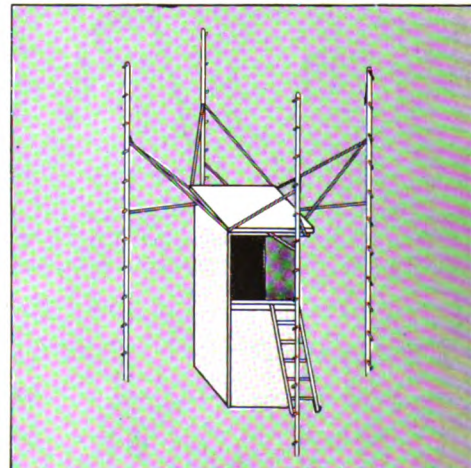


R.F.-1/6000

"C"—PROB. GENERATOR BUILDING

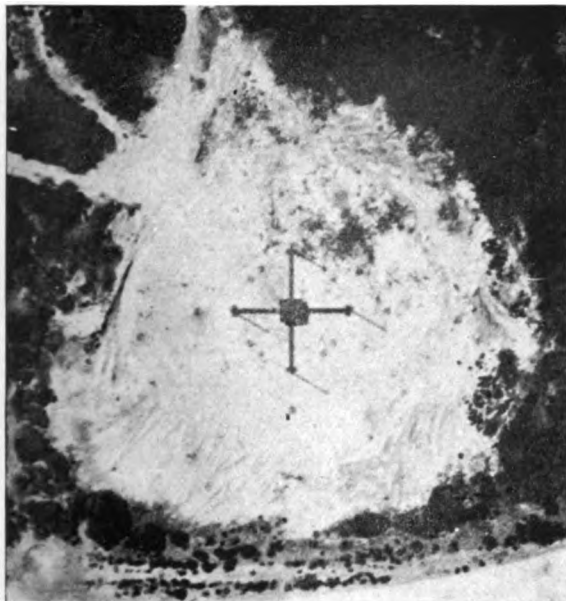


HIGH FREQUENCY—SEMIPORTABLE

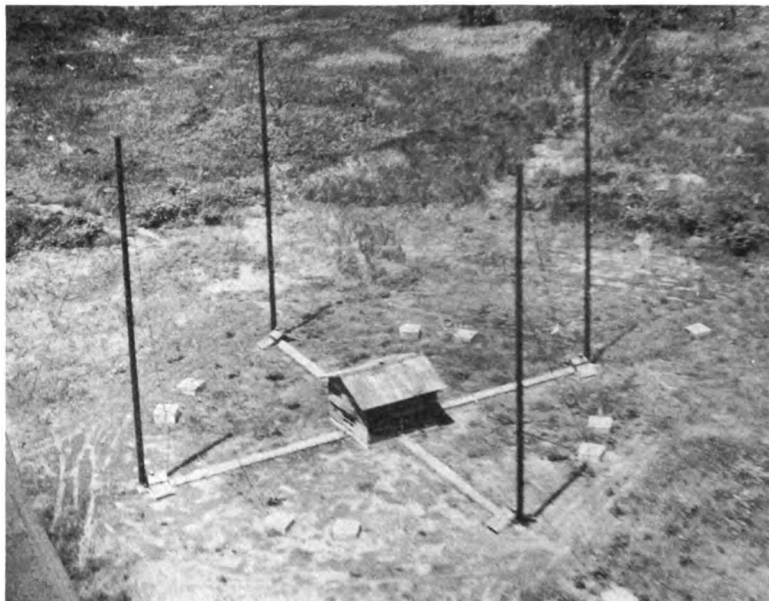


HIGH FREQUENCY—SEMIPORTABLE  
(DIAGONAL DISTANCE—18 FEET)

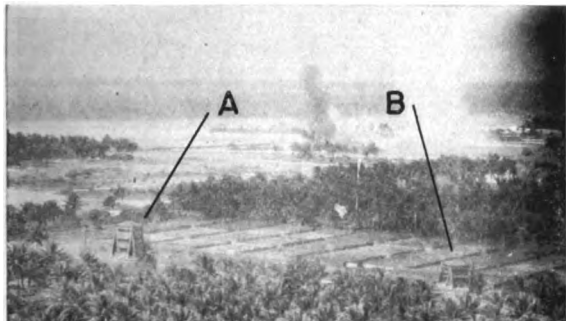




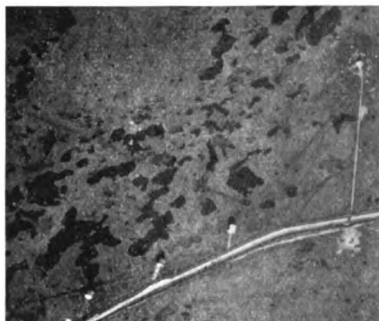
**MEDIUM FREQUENCY ADCOCK**



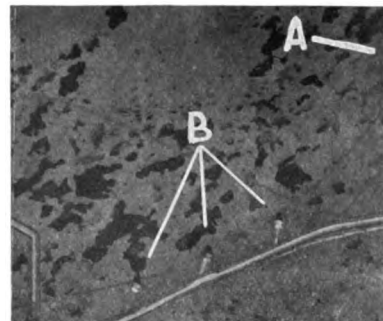
**MEDIUM FREQUENCY ADCOCK**



**"A"—HIGH FREQUENCY ADCOCK**  
**"B"—PROB MED. FREQUENCY LOOP TOWER**



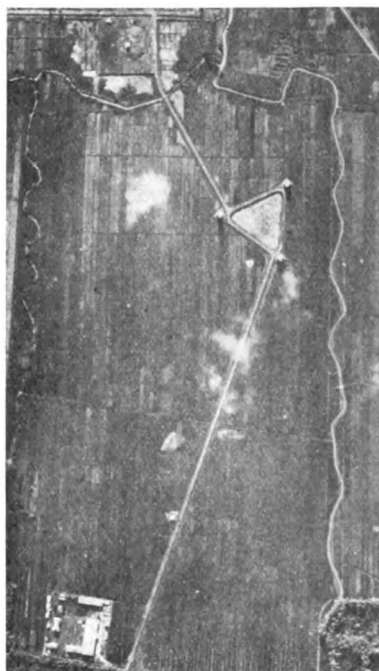
**"A"—MEDIUM FREQUENCY ADCOCK**  
**"B"—HIGH FREQUENCY ADCOCK**



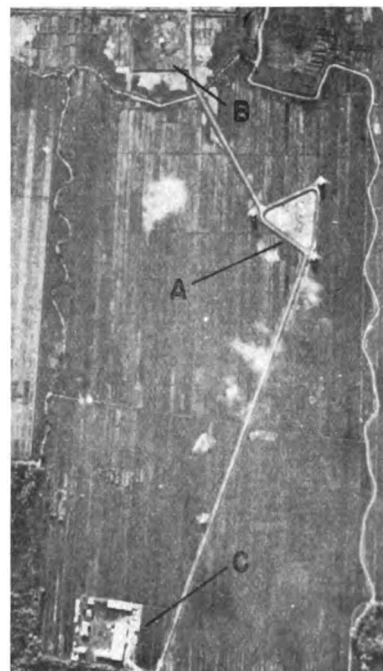
R. F. - 1/10000



**MEDIUM FREQUENCY LOOP TOWER**



**"A"—HIGH FREQUENCY ADCOCK**  
**"B"—MEDIUM FREQUENCY ADCOCK**  
**"C"—D. F. CENTER**



R. F. - 1/10000



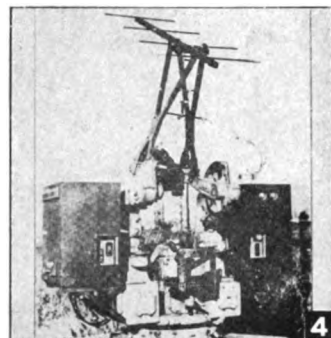
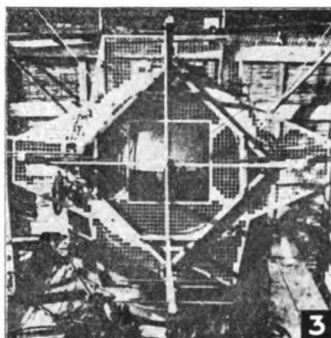


### 1. M. 1933 150 cm. SEARCHLIGHT

This 150 cm searchlight, either mobile or fixed is the most commonly encountered Japanese AA light. The canvas cover often imparts a white tone on photographs.

### 2. M. 1930 SMALL SOUND LOCATOR

Used with the 150 cm searchlight, this sound locator was the only detector until the recent advent of radar control. A comparator (electrical remote control) is used with the sound locator.



### 3. MK. IV, MOD 3 RECEIVING ANTENNA

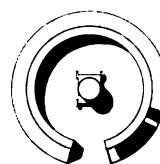
Captured photograph of the MK. IV, Mod, 3 radar receiver. The receiving antenna consists of 4 Yagis mounted on a 110 cm. searchlight.

### 4. MK. IV, MOD 3 TRANSMITTING ANTENNA

Captured photograph of the MK. IV, Mod. 3 radar transmitter. The rotating mount consists of Yagi antennae, radar equipment, and operator's seat. This equipment was captured in the Mariana and Palau Islands.



### CIRCULAR REVETMENT



PLAN

**DIMENSIONS** Interior diameter: 8' to 35', 30 diameter most common.

**LOCATION** Clearings, open waterfront areas, ridges, near heavy AA.

**REMARKS** The most common type of searchlight emplacement.



### DOUBLE WALL REVETMENT



PLAN

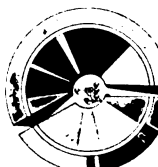
**DIMENSIONS** Outer walk: 35' diameter, Inner space: 15' diameter.

**LOCATION** Clearings, promontories, near heavy AA.

**REMARKS** Designed for manual operation of the 150 cm. light with extended hand control.



### CIRCULAR SOUND LOCATOR REVETMENT



PLAN

**DIMENSIONS** 35' diameter (Inner rim)

**LOCATION** Generally within 100' to 150' of circular or double wall searchlight revetments.

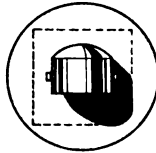
**REMARKS** Concave cross section for accoustical efficiency.

**CIRCULAR PLATFORM**

**DIMENSIONS** 12' diameter.

**LOCATION** Island perimeters, near heavy AA - especially 127 mm.

**REMARKS** Prefabricated steel construction. Generator equipment may be housed under the platform.



PLAN

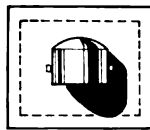


**RECTANGULAR PLATFORM**

**DIMENSIONS** 10' x 12' or 12' x 12'

**LOCATION** Island perimeters, near heavy AA - especially 127 mm

**REMARKS** Reinforced concrete or wooden frame. May house generator equipment.



PLAN

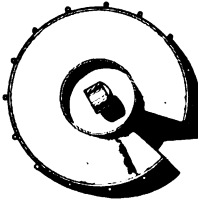


**RAISED REVETMENT**

**DIMENSIONS** Revetment diameter: 12' to 15', outermost diameter: 40' to 50'.

**LOCATION** Flat areas, island perimeters, ridges, near heavy AA.

**REMARKS** Earth or sand bag construction. May house generator equipment.



PLAN



**98 cm. TRUCK MOUNTED LIGHT**

**DIMENSIONS** Length: 19'.

**LOCATION** Complete mobility.

**REMARKS** Easily concealed or camouflaged. Self-contained source of electricity.



PLAN



**GENERATOR TRUCK**

**DIMENSIONS** Length: 18':

**LOCATION** Near any type of searchlight emplacement.

**REMARKS** Commonly emplaced in rectangular revetments, roadside excavations.



PLAN





# TECHNICAL STUDIES

## NAVIGATIONAL AIDS SUMMARY

CONFIDENTIAL

15 MARCH 1945

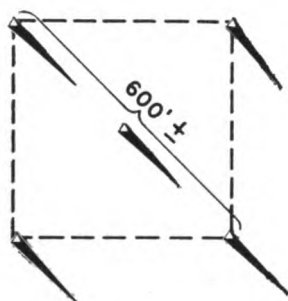
### NAVIGATIONAL AIDS SUMMARY

Navigational aids are electronics installations that transmit signals for position finding purposes. Known Japanese installations transmit one or more radio beams for guiding mobile units, such as ships or planes, to target or home base. These include radio range stations, communi-

cations stations, single radiating lattice masts, portable beam transmitters, and various ship navigational aids. In addition, the Japanese use Direction Finders as aids to navigation.. These are treated separately in this supplement.

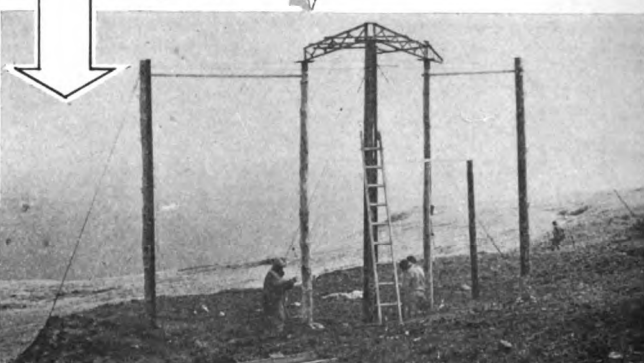
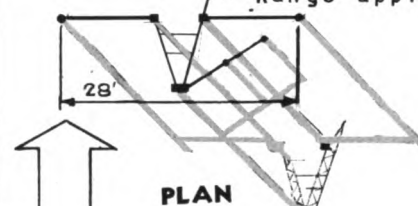
#### RADIO RANGE STATIONS FOR AIRCRAFT

- Five lattice masts, 200'  $\pm$  High
- Capable of transmitting one or several beams to any point of compass.
- Range 200 - 400 miles.



#### NAVIGATIONAL AIDS FOR SHIPS

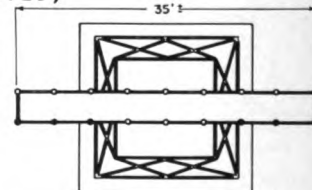
- Two types observed to date:  
KISKA
  - Poor design
  - Operates at 60-70 Mcs.
  - Range approx. 100 miles.



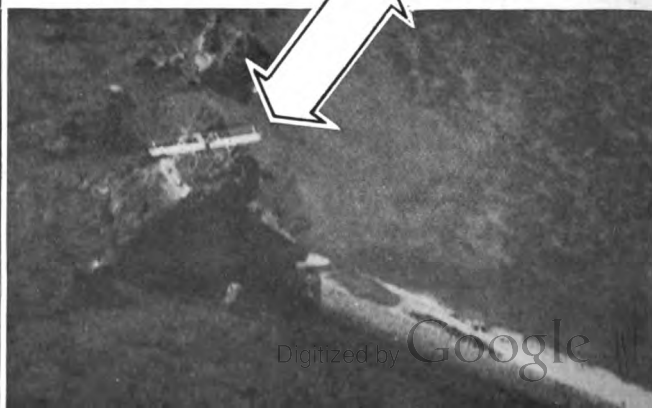
CHICHI JIMA (SUSPECTED)

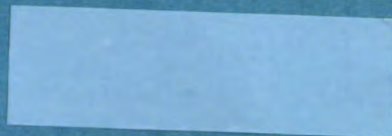


ELEVATION



PLAN







**USN**  
**PHOTOGRAPHIC**  
**INTELLIGENCE**  
**USN**

